Application No.: 10/530,789 Filing Date: April 8, 2005

#### AMENDMENTS TO THE CLAIMS

1. (Currently amended) An arbutin ester compound represented by formula (1):

#### Formula (1)

wherein Ra is selected from the group consisting of:

 $R_1$ -CH=CH<sub>2</sub>, wherein  $R_1$  is a single bond, an alkyl group or an arylene group;

$$CH_3$$

$$R_1C = CH_2$$
, wherein  $R_1$  is a single bond, an alkyl alkylene group or an arylene

group;

 $R_1$ -COOCH=CH2, wherein  $R_1$  is a single bond, an <u>alkyl\_alkylene</u> group or an arylene group;

 $R_1$ -COOH, wherein  $R_1$  is a single bond, an <u>alkyl\_alkylene</u> group or an arylene group;

 $R_1$ -COO- $R_2$ , wherein  $R_1$  is a single bond, an <u>alkyl</u> <u>alkylene</u> group or an arylene group; and  $R_2$  is an alkyl group or an aryl group; <u>and</u>

 $R_1$ -C(CH<sub>3</sub>)<sub>3</sub>, wherein  $R_1$  is a single bond, an <u>alkyl alkylene</u> group or an arylene group.

#### 2.-10. (Canceled)

11. (Currently amended): A method of inhibiting composition that inhibits tyrosinase comprising, providing as an active ingredient, at least one of the arbutin ester compounds according to claim 1, wherein tyrosinase is inhibited.

#### 12. (Canceled)

13. (Currently amended): A process for producing an arbutin ester compound, comprising the step of carrying out an esterification reaction of arbutin with a carboxylic acid compound represented by one of formulae (11) to (15) or (17):

### Formula (11)

Application No.: 10/530,789 Filing Date: April 8, 2005

### A-OCO-R<sub>1</sub>-CH=CH<sub>2</sub>

wherein A is hydrogen or a substituted or unsubstituted alkyl or vinyl group; and  $R_1$  is a single bond, an alkyl group or an arylene group;

Formula (12)

### $A-OCO-R_1-C(CH_3)=CH_2$

wherein A is hydrogen or a substituted or unsubstituted alkyl or vinyl group; and  $R_1$  is a single bond, an <u>alkyl alkylene</u> group or an arylene group;

Formula (13)

### A-OCO-R<sub>1</sub>-COOCH=CH<sub>2</sub>

wherein A is hydrogen or a substituted or unsubstituted alkyl or vinyl group; and  $R_1$  is a single bond, an <u>alkyl alkylene</u> group or an arylene group;

Formula (14)

## A-OCO-R<sub>1</sub>-COOH

wherein A is hydrogen or a substituted or unsubstituted alkyl or vinyl group; and  $R_1$  is a single bond, an <u>alkyl alkylene</u> group or an arylene group;

Formula (15)

## A-OCO-R<sub>1</sub>-COO-R<sub>2</sub>

wherein A is hydrogen or a substituted or unsubstituted alkyl or vinyl group;  $R_1$  is a single bond, an <u>alkyl alkylene</u> group or an arylene group; and  $R_2$  is an alkyl group or an aryl group;

Formula (17)

# $A-OCO-R_1-C(CH_3)_3$

wherein A is hydrogen or a substituted or unsubstituted alkyl or vinyl group; and  $R_1$  is a single bond, an <u>alkyl alkylene</u> group or an arylene group.

Application No.: 10/530,789 Filing Date: April 8, 2005

- 14. (**Original**): The process according to claim 13, wherein the esterification is carried out in the presence of an enzyme catalyst.
- 15. (**Original**): The process according to claim 13, wherein the esterification is carried out in the presence of a chemical catalyst.
- 16. (**Original**): The process according to claim 13, wherein the esterification is carried out while performing a dehydration treatment.
- 17. (**Original**): The process according to claim 13, wherein the esterification reaction step is followed by the steps of:

extracting and isolating unreacted carboxylic acid derivative(s) from the esterification reaction mixture with a nonpolar organic solvent; and subsequently,

adding excess water to extract and isolate unreacted arbutin and to precipitate the arbutin ester compound.

### 18-36. (Canceled)

- 37. (**Currently amended**) The <u>A</u> composition <u>comprising an arbutin ester compound according to Claim 1 and 11, further comprising a suitable carrier.</u>
- 38. (New) An external preparation for the skin comprising the composition according to claim 37.
- 39. (New) The arbutin ester compound of Claim 1, wherein -Ra is selected from the group consisting of:
  - $-R_1$ -CH=CH<sub>2</sub>, wherein  $R_1$  is a single bond, an alkyl group or an arylene group;
  - $-R_1$ -C(CH<sub>3</sub>)=CH<sub>2</sub>, wherein  $R_1$  is a single bond, an alkyl group or an arylene group;
  - $-R_1$ -COOCH=CH<sub>2</sub>, wherein  $R_1$  is a single bond, an alkyl group or an arylene group; and
    - $-R_1$ -C(CH<sub>3</sub>)<sub>3</sub>, wherein  $R_1$  is a single bond, an alkyl group or an arylene group.
- 40. (New) The arbutin ester compound of Claim 1, wherein -Ra is selected from the group consisting of:
  - $-R_1$ -CH=CH<sub>2</sub>, wherein  $R_1$  is a single bond or an alkyl group having 1 to 16 carbon atoms;
    - $-R_1$ -C(CH<sub>3</sub>)=CH<sub>2</sub>, wherein  $R_1$  is a single bond;
    - -R<sub>1</sub>-COOCH=CH<sub>2</sub>, wherein R<sub>1</sub> is an alkyl group having 1 to 16 carbon atoms; and
    - - $R_1$ -C (CH<sub>3</sub>)<sub>3</sub>, wherein  $R_1$  is a single bond.

Application No.: 10/530,789 Filing Date: April 8, 2005

- 41. (**New**) The arbutin ester compound of Claim 1, wherein the compound is selected from the group consisting of 6-*O*-acryloyl arbutin, 6-*O*-methacryloyl arbutin, 6-*O*-vinyladipoyl arbutin, arbutin 6-*O*-adipoyl acid ester, 6-*O*-methyladipoyl arbutin, 6-*O*-decenoyl arbutin, 6-*O*-louroyl arbutin, 6-*O*-benzoyl arbutin, 6-*O*-butanoyl arbutin, 6-*O*-lauroyl arbutin, 6-*O*-stearoyl arbutin, and 6-*O*-(10-undecylenoyl) arbutin.
- 42. (**New**) The arbutin ester compound of Claim 1, wherein the compound is 6-O-(10-undecylenoyl) arbutin.
- 43. (New) A composition comprising the arbutin ester compound of Claim 42 and a suitable carrier.
  - 44. (New) An external preparation for the skin comprising the composition of claim 43.
- 45. (New) The method of Claim 11, wherein -Ra of the arbutin ester compounds is selected from the group consisting of:
  - -R<sub>1</sub>-CH=CH2, wherein R<sub>1</sub> is a single bond, an alkyl group or an arylene group;
  - $-R_1$ -C(CH<sub>3</sub>)=CH2, wherein  $R_1$  is a single bond, an alkyl group or an arylene group;
  - $-R_1$ -COOCH=CH<sub>2</sub>, wherein  $R_1$  is a single bond, an alkyl group or an arylene group; and
    - $-R_1$ -C(CH<sub>3</sub>)<sub>3</sub>, wherein  $R_1$  is a single bond, an alkyl group or an arylene group.
- 46. (New) The method of Claim 11, wherein -Ra of the arbutin ester compounds is selected from the group consisting of:
  - - $R_1$ -CH=CH<sub>2</sub>, wherein  $R_1$  is a single bond or an alkyl group having 1 to 16 carbon atoms;
    - $-R_1$ -C(CH<sub>3</sub>)=CH<sub>2</sub>, wherein R<sub>1</sub> is a single bond;
    - - $R_1$ -COOCH= $CH_2$ , wherein  $R_1$  is an alkyl group having 1 to 16 carbon atoms; and
    - $-R_1$ -C(CH<sub>3</sub>)<sub>3</sub>, wherein R<sub>1</sub> is a single bond.
- 47. (**New**) A method of Claim 11, wherein the arbutin ester compounds are selected from the group consisting of 6-*O*-acryloyl arbutin, 6-*O*-methacryloyl arbutin, 6-*O*-vinyladipoyl arbutin, arbutin 6-*O*-adipoyl acid ester, 6-*O*-methyladipoyl arbutin, 6-*O*-decenoyl arbutin, 6-*O*-oleoyl arbutin, 6-*O*-pivaloyl arbutin, 6-*O*-benzoyl arbutin, 6-*O*-butanoyl arbutin, 6-*O*-lauroyl arbutin, 6-*O*-stearoyl arbutin, and 6-*O*-(10-undecylenoyl) arbutin.
- 48. (New) The method of Claim 11, wherein said at least one of the arbutin ester compounds is 6-O-(10-undecy1enoyl) arbutin.